

## THE SOLAR AGE

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Albert Einstein, one of the most famous physicists of all times, once concluded his life experience in the following sentence:

“It is impossible to solve a problem with the same means that caused this problem.” And Max Planck, another famous physicist, concluded his experiences on changing paradigms: “A New scientific truth does not triumph by convincing the advocates of the old truth and making them see the light, but rather because its opponents eventually die out and a new generation grows up familiar with it.”

The truth is: civilization faces a turning point, because we are at the borderline of the present global energy system – due to the following reasons:

- 1) The conventional fossil energies are running out. Who tries to extend the life time of the fossil energy system by using so called non conventional fossil energies, such as oil sands or methane bubbles on the grounds of the oceans, it will overstress definitely regional ecological systems and the global ecosphere.
- 2) The ecological limit of fossil energy consumption is closer than the limit of resources. The shift to Renewable Energies must happen now. Time is overdue.
- 3) The nuclear option can only fail. The permanent disposal of more and more radioactive waste for more than 10,000 years is irresponsible: Which security system can work for such a long time period? Moreover, the civilian use of atomic power remains the bridge to the proliferation of atomic weapons, which must be avoided definitely.
- 4) The burning of biomass without immediate replanting – as it is the practice in many Third World regions – erodes the soil, initiates desertification and provokes mass migration into overcrowding slums - the preHELLs of mankind.
- 5) The curve of cheap fossil and uranium reserves and therefore its supply possibilities will decrease. On the other hand the curve of energy demand will increase. Only Renewable Energy can avoid a crossing of the two curves of demand and supply in the near decades.

If Renewable Energy is not introduced in a broad scale and in time, the dangers of global economic crisis and brutal wars will be the consequence. The Harvard Business School warned about these dangers already in the 70ies.

- 6) The future option of atomic fusion is a non-option. No supporter of atomic fusion is asked and speaks about the costs, which will be three to ten times higher than for atomic fission. No one of them speaks about the incompatibility of reactors of probably 100,000 or more MW with market economy, social, economic or democratic structures. They all ignore the prognosis of the former head of the Plasma Fusion Center of MIT, M.L. Lidsky, that "if

the fusion program produces a reactor, no one will want it." And they ignore the fact, that there is no need for another energy option if we take advantage of the solar potential which is annually 15,000 times higher than the annual world fossil and nuclear energy consumption.

- 7) Because Energy is the basic need of life, it is a short-sighting and dangerous economic rule to leave the basic decisions for future energy supply only to comparisons on actual energy costs. The costs for the outrunning conventional energies go up.

Renewable energy costs will go down, because they are almost exclusively technology costs, except for Biomass. All technology costs are degressive in the course of technological progress and mass production.

- 8) Conventional fossil/atomic energies have multiple negative macroeconomic side-effects - such as the increasing need to protect the globalized power lines against attacks; the high water consumption for mining, extractions and for heating power stations; the currency-costs for importation; and the environmental and health damages. Very few people are aware of the fact that the conventional energy system is the biggest water consumer. And very few people are aware of the fact that millions of people die annually because of energy pollution.

In contrast, Renewable Energy sources have multiple positive macroeconomic and macrosocietal benefits, because they help to avoid all these negative-effects mentioned above.

- 9) Only with Renewable Energies we can come to real energy efficiency. In the long global conventional energy chain from the mines and wells to the customers, sometimes over distances of more than 10 000 miles, there are many energy losses. Only with short energy chains based on the use of indigenous Renewable Energies, energy losses will be reduced radically.

- 10) The global energy demand increases faster than the introduction of Renewable Energies. That means: civilization continues to run into the fossil and atomic energy trap, even with the implementation of the Kyoto-Protocol.

- 11) Conventional energies are politically privileged everywhere in the world by large amounts of public money for research and development; by military protection costs; by 300 billion Dollar of subsidies annually and by the energy laws tailored on them. In contrast to this, Renewable Energies are politically discriminated. Less than a total of 50 billion Dollars public money worldwide were spent in the last 20 years to promote Renewable Energy.

The result of all these facts and trends: Renewable Energies are much more than an additional option to the old energy system. They are the alternative, the general solution, able to cover all energy needs. A true realistic picture on the state of the globe shows: To promote them must become the primary strategy everywhere. Since the problems and dangers of civilization are on Earth and not on the Moon or the Mars, Renewable Energy promotion is more important than space programs. Since the dependency on fossil energy makes all nations vulnerable, abolishing it is the top security question and more important than new weapon programs. In 1953 US-President Eisenhower gave the famous speech "Atoms for Peace". This promise failed. The perspective is "Solar for Peace".

To ignore all the strategic opportunities and benefits for the people merely because of some higher costs in the beginning is nothing less than sheer lunacy on the part of an autistic energy

behavior in combination with restricted views about economy. The most restricted and wrong view about Renewable Energies is the prejudice that they would be an economic burden. The most urgent need is to overcome these mental barriers, including the psychological barriers, caused by a superiority attitude of the conventional energy protagonists and an inferiority attitude of many Renewable Energy protagonists.

We have to enlighten our societies about the unique opportunities that Renewable Energies are offering. It is impossible to convince the people only by developing good technologies and practical instruments. A new strategy without philosophy is like a church without religion.

The turn to Renewable Energies is a mental and cultural challenge. The practical challenge is to develop policy and financial instruments for the transformation of the macropolitical, macroeconomic, and macrosocietal benefits into individual advantages and benefits. But to convince people requires to speak not only on monetary matters, but about values and life benefits.

At the UN-Johannesburg-Summit on Sustainable Development in August last year the German Chancellor invited all governments to an International Conference on Renewable Energy. This conference will take place from June 1-4, 2004 in Bonn. I had the opportunity to inspire him to take this step. Moreover, in Johannesburg the initiative was launched for the so called group of "like minded countries", who declared their will to promote Renewable Energies more ambitiously than the Final Resolution of the Johannesburg Conference suggested. The idea for this initiative was originated by the World Council for Renewable Energy (WCRE) in June 2002 in Berlin.

In order to act as a driving global prime mover for Renewable Energy, the WCRE adopted in Berlin at its First World Renewable Energy Forum on Policies and Strategies the Action Plan for the Global Proliferation of Renewable Energy. In this Plan we call for twelve concrete steps for new international action. One is to establish an International Renewable Energy Agency (IRENA) for overcoming the double standard of the international system that includes intergovernmental energy organizations for nuclear and fossil energy - such as the International Atomic Energy Agency and the International Energy Agency - but none for Renewable Energies.

To establish IRENA is a world project. It must not happen on a multinational consensus basis, because then it will last too long. It should be based on a new coalition of willing governments, and then it will create a self-dynamic increasing support.

Parallel to the International Governmental Conference the German Parliament will invite to an international Parliamentarians Forum for Renewable Energy. I will have the honor to become the Chairman of this Forum. Because Renewable Energy is the energy of the people, the leading forces in political institutions must be the directly elected representatives of the people. Moreover, two days before the Conference the WCRE will hold its 2<sup>nd</sup> World Forum as the platform of the NGOs acting in the field of Renewable Energy. We will present a Global Charter for Renewable Energies, championing all the profound motivations for the construction of the Solar Age.

This age will come, sooner or later. If it is later, the problems we will have to face world wide will be worse. The sooner it comes, the better for society and human race. The term "age" is normally taken to mean something transitory, an emerging and later on again declining epoch that is characterized by one special feature. This is the case of the fossil and atomic age.

Once the solar age will be established, it will become synonymous with a global society that truly does justice to the term sustainability. It will characterize the whole future.

The common premise of all path breaking steps for Renewable Energies is that they compel us to review ways and methods how to discuss and to implement Renewable Energies. In my point of view we should act on the following guidelines:

Guideline One:

**Target the dimension of total replacement of nuclear and fossil energies**

Just to call to double the share of Renewable Energy within 10 years is too less in order to tackle the real challenges. A lot more dynamic is needed, and this starts in minds. The possibility of completely covering energy demands by means of Renewable Energy sources must be shown, worldwide and for each country.

By highlighting this, it is not necessary to calculate it accurately. No serious economist is in a position to predict the future cost of photovoltaic solar energy conversion, because, for example, no one can predict neither the applications and their different impact on costs, nor the speed at which costs will decline as a result of mass production, nor further technological developments. It is enough to outline the principle opportunity to replace all conventional energies - what can be indicated with already applicable Renewable Energy Technologies - in order to overcome their mythology of being indispensable.

If society and its players become aware of the possibility of full coverage being provided by Renewable Energies, more and more decision-makers will abandon the obsessive idea that further large-scale investments with long-term capital tie-up for conventional energy plants would be needed.

The more we rid our minds of this notion, the more space there will be for imagination and creativity in establishing the solar age, and the more politicians, designers and businesses will take interest and invest creativity in the promotion of Renewable Energy.

Guideline Two:

**Take a broad view on energy**

To discuss energy as a separated special matter is an intellectual box. It is a principle mistake to leave the energy discussion only to energy technology or energy economy specialists. Remember what the Swiss Nobel-Prize laureate for Literature Friedrich Dürrenmatt wrote in his piece 'The physicists': "The methods of physics belongs to the physicists, the results belong to all people. What belongs to all people, can only become solved by all."

The CO<sub>2</sub> emissions are not the only problem of fossil energy. The radioactive contamination is not the only problem of atomic power. Many other dangers are caused by using atomic and fossil energies: from the polluted cities to the erosion of rural areas; from water pollution to scarcities and desertifications; from mass migrations to overcrowded settlements; from the life security of individual people to the security of states. Because the present energy system is the hard core of these problems, renewable energy is the hard core for its rehabilitation. That means: macroeconomically and politically nothing is better and cheaper than the substitution of conventional energies by Renewables. For soft energies you need a hardline strategy.

Guideline Three:**Calculate energy systems, not only energy plants**

The comparison usually drawn up in energy economics between the investment costs per installed kilowatt-hour is analytically superficial. Instead of comparing single technology applications, comprehensive energy systems need to be compared with each other, calculating the total costs for conventional energy in its long supply chain – in contrast to the costs for providing solar energy with only a short supply chain, if any. Between 70 and 80 percent of the costs of conventional power supplies are not attributable to the actual electricity generation costs. The productivity of utilizing solar power lies in the elimination – partly or totally – of these 70 to 80 percent.

And with different new kinds of decentralized energy storing technologies - not just hydrogen -, and combined with information technologies, Renewable Energies will create a new technological revolution with unique new efficiencies and synergetic solutions towards a real New Economy, the Solar Information Society.

Guideline Four:**Motivate new business partners for renewable energies**

Since the optimum use of renewable energies means the substitution of atomic and fossil primary energies by solar conversion technologies, the highly concentrated energy industry is not the only suitable partner for change. The energy industry, too, can switch from the role of energy supplier to that of a technology provider. But the conventional energy industry is unlikely to do so with the commitment it needs, because their interests are too much tied to the old structures and investment patterns.

Therefore, the prime candidates are the industries whose current sphere of activity is relatively close to solar conversion technologies: the engine industry; the glass industry; the electrical appliance industry; the electronics industry; the building materials industry; mechanical and plant engineering companies; manufacturers of agricultural implements (for biomass harvesting equipment); and, not least, agriculture and forestry. Our farmers will become combined food, energy and raw material producers, and they will be ecologically integrated. The agricultural economy will come to a revival with many new jobs. Our farmers will be the oil sheiks of tomorrow.

The automobile sector has an increasing interest to become independent from fossil fuels. It is not only hydrogen, it is biofuel which offers an immediate turn to renewable and clean fuels. Therefore, it is a remarkable step - which has been initiated by us - that the Environment Report 2003 of DaimlerChrysler is focussed totally on Renewable Energy. In 2002, I introduced in the German Parliament a new law, which became adopted, for a 100% tax exemption for all biofuels used in cars.

Architects and construction engineers should be motivated to play a key-role in setting-up the new standard of zero-emission-solar-buildings - since 30-40% of total conventional energy consumption are needed to cool and heat buildings.

The medical doctors and health-insurance companies should become motivated to be supporters for Renewable Energies. One of the incentives for that will be an International Meeting on Energy and Health organized by the World Council for Renewable Energies.

Guideline Five:**Show the opportunities for fast implementations**

The conventional experience that a new energy source takes many years to establish itself, does not apply to renewable energies. While their provision requires large amounts of new human capital, it does not need the infrastructural outlay necessary for the nuclear and fossil energy chains.

The installation of a fossil or atomic power station requires up to ten years or more, the installations of a windmill including its basement takes perhaps one week. Renewable Energy is provided on a module basis. That means that renewable energies can be established much faster than conventional energy experts assume.

There is no faster way to overcome an energy availability crisis - like in California - than by Renewable Energies. Renewable Energies offer, in contradiction to the view of many conventional energy experts, short term solutions.

The question how much time is really necessary for creating the solar age is fairly easy to be answered: not long, if we realize a grand Renewable Energy Strategy.

Guideline Six:**Respect the economic laws of nature over the laws of the market**

The liberalization of the energy markets relates to overcoming the existing regional monopoly and energy market structures, who favor the old energies. Renewable energies will have different costs in different places. Their productivity depends on the different natural supplies of energy available in each case.

To be able to fully use their potential in the field of commercial energy supplies, they therefore need a special pricing scheme that is designed on a degressive scale in the course of their introduction, differentiated according to their different technical state of development and by regions or countries.

In the context of Renewable Energies, we must not think in the category of energy markets, but of new technology markets. The priority of the law of nature over market laws is mandatory. We cannot act contrary to the laws of nature for too long. Nature seems to be weaker, but in the long run it is stronger. It seems to be calculable, but its reactions are incalculable. It seems it can be mastered, but it will master us. It seems to be very tolerant, but it already started to strike back disastrously.

**The common messages are:**

- All kinds of life require energy at any time. This basic requirement of life can only become really satisfied by Renewable Energies - not by atomic and fossil energies.
- An increasing number of people do not believe anymore that the climate and global environment catastrophes could be stopped. "No future" - mentalities and fatalism arise and poison the social atmosphere. Only with Renewable Energies we can stimulate new hopes – not with the energies bound to be depleted.
- It is a human right to use the kind of energy that does not negatively effect the health of the people. This right can only be provided by Renewable Energy - not by the present energy system.

- All our children and grandchildren have the right not to have worse living conditions than we have. This can be achieved only by Renewable Energies - but not by atomic and fossil energies.
- All nations have the right of self-determination, which requires energy independency. That is only possible with Renewable Energy - not with globally monopolized and concentrated conventional energy.
- People have the desire to have enough energy for their way of life and for their quality of life. To provide it in the future - not only for a minority - it can be only done by Renewable Energy - not by atomic and fossil energy.
- The sense of a democratic society is to have a common life based on two values: individual freedom and acceptable social conditions. Individual freedom without touching and restricting the life conditions of other people can only be achieved with Renewable Energy - not by the exhausting old energies.

Supporters and promoters of the conventional energies may have more influence up to this point. But the Renewable Energy promoters have the superior idea for the future.

To quote Stanislav Lec:

“Most people begin by far too early to start the real important things in life too late.”

It is already very late, but we can reverse the situation.